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JUL 1932

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •

JULY 9, 1932

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A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

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The Weekly Summary of Current Science

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Edited by WATSON DAVIS

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? DO YOU KNOW THAT ?

Cone-shaped snowflakes are sometimes observed in snowfall in Vermont.

The last of the heath hens, which for three years has been sighted on Martha's Vineyard, is still alive, according to a recent report.

As summer comes round again, home economics specialists remind the housekeeper that the food compartment in a refrigerator should not get warmer than 50 degrees and the milk compartment not warmer than 45.

A Manta or Blanket Fish recently captured in Florida waters measured over 18 feet long and over 19 feet wide.

The Solomon Islands were named by a sixteenth century Spanish explorer, who fancied that the islands would yield wealth worthy of King Solomon of old.

Deaths from tuberculosis are increasing in some sections of New York State.

Lettuce was used as a salad in the days of ancient Rome.

A blue whale at birth measures 23 feet in length, but on a diet of its mother's milk the baby grows to 58 feet in seven months.

Almost a century ago, in 1837, a professor of zoology at the University of Michigan happened to lay aside a fine breastbone of a passenger pigeon —thousands of the birds were eaten in those days—and today that breastbone is treasured as the only skeletal relic of the passenger pigeon in Michigan.

Policemen in St. Louis get realistic target practice by shooting at the actors on a motion picture screen.

Ireland is the only country in which statistical tables show that males have a longer expectancy of life than females.

The skull of an aurochs found in the ruins of King Minos' Palace in Crete shows the ancient type of bull which was used in arena sports in Crete.

The "Siamese Twins" elms near Ottawa, Ohio, are two trees joined at one point several feet above the ground.

WITH THE SCIENCES THIS WEEK

CURIOSITY-AROUSING questions are prepared concerning the most interesting and important news in each issue. These questions should be a mental stimulant for the adult reader and a boon to the teacher who uses the Science News Letter to add zest to her classroom instruction.

Book reference in italic type is not the source of information of the article, but a reference for further reading on the subject of the article. Books cited can be supplied by Librarian, Science Service, at publisher's price, prepaid in U. S.

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ARCHAEOLOGY

What are the sizes of the 500 Stone Age axes recently found in "wholesale storage" in Egypt? p. 21.

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CHEMISTRY

What vitamin is twins? p. 20. *The Vitamins —H. C. Sherman and S. L. Smith—Chem. Cat. Co.*, 1931, $6.

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Is there any relation between chronic infections of teeth, tonsils, sinuses or the digestive tract and mental disease? p. 21.

MEDICINE

X-Rayed Cells Live Faster; Die of Premature Old Age

Irridated Cancer Cells Not Killed, Research Shows; They Live Normal Life But Go Through Cycle Sooner

WHEN X-RAYS are used to treat cancer, the cells of the cancer are not killed directly but are made to live more merrily, finish their normal life more rapidly and die of senility at an earlier age.

This answer to the hitherto unsolved problem of what happens when a cancer victim is irradiated and his cancer decreases in size was given to the American Association for the Advancement of Science by Dr. Raphael Isaacs of the University of Michigan, who made observations on 923 patients before he announced his findings.

It is expected that this discovery will be of great importance in understanding various kinds of cancer and other diseases of cell growth, such as leukemia, lymphoblastoma and pernicious and other anemias.

Treatment of cancer by X-rays results in a premature old age, Dr. Isaacs found. The premature old age occurs not in the patient but in the cells of the malignant growth with which he is afflicted. This is a case where premature senility is welcome.

Dr. Isaacs studied the various kinds of the blood cells and noted the effect of the X-ray treatments given the patients. Even after X-ray therapy, the blood-forming cells, both white and red, go through their lives in an orderly manner and die normal deaths.

"Nothing happens to the cells that would not have happened to them if they had lived their normal life," said Dr. Isaacs, "except that X-rays make them go through the process somewhat faster. X-rays act by hurrying the onset of old age and not by killing directly."

Radiologists have noted that there is a lag between the time of the X-ray treatment and the effect that is produced. Dr. Isaacs said that it corresponds to the time it takes the irradiated cells to live and die, in an accelerated but normal manner. Some cells, like germ cells and white blood cells, die fairly quickly after treatment with X-rays. Dr. Isaacs finds that these cells have a short adult life and therefore die soon after it is reached. Other cells, like those of muscle, nerve and fibrous tissue cells, live long after they become adults and when stimulated to develop to maturity by X-rays, they do not die of senility for a long time. The effects of the X-ray treatment are therefore delayed longer.

A favorite explanation of the action of X-rays and radium on the cancer and other cells has been that they killed the cells, but the researches reported by Dr. Isaacs repudiate this theory.

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ENGINEERING

Soap Bubbles Reveal Strength of Steel Beams

WILL the new bridge safely carry the heavy traffic that is going to flow over it?

Ask a soap bubble.

That is what engineers at the University of Michigan have been doing; and the soap bubble answers are so accurate that they are being used in a mathematical formula to picture the stress in metal parts of complicated shape.

This procedure is revealed in a report made to the American Society of Mechanical Engineers by Dr. P. Allerton Cushman of the College of Engineering in the University of Michigan. He told how the soap bubble has become a valuable aid in the determination of stresses in materials. By mapping the contour of a flimsy soap film over the cut-out model of the cross-section of a machine part or skyscraper beam, engineers can determine quickly and accurately just how much twisting or bending stress will affect the original of the model.

The apparatus devised to record these findings is surprisingly simple. Halfway down in a square box a brass sheet is sealed, with a portion of the metal cut out in copy of the cross-section of the article to be tested. Topping the box is a glass plate inset with a depth gauge. In operation a film of soap solution is drawn across the cut-out design, water is forced into the lower part of the box, causing the confined air beneath the plate to push up the film, and with the depth gauge the varying level of the film is measured from the glass top. Many readings are made in various spots, curves are charted between the points, and a contour map results which locates stress points which may easily be interpreted in their meaning for the designer of metal work.

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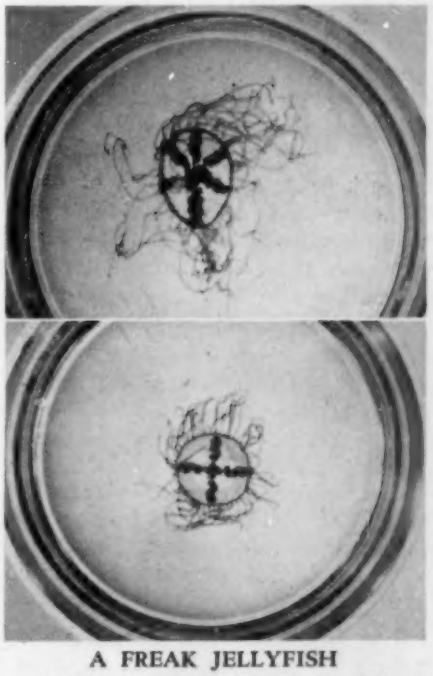
CHEMISTRY

Colored Coverings Prevent Rancid Foods

SPECIAL red and green wrappers and bottles are likely to be used in the future for packaging oils, mayonnaise, butter, lard, potato chips and other oil-bearing foods to prevent them from becoming rancid as the result of a Department of Agriculture discovery that certain wavelengths of light produce rancidity.

Mayne R. Coe of the food research division of the U. S. Bureau of Chemistry and Soils reported in *Science* that the keeping quality of oily foods is greatly enhanced by the use of packages that screen out the (*Please turn page*)



A FREAK JELLYFISH

—matching two-headed turtles and four-legged chickens, turned up in the zoology laboratory collections of the University of Southern California. Normal jellyfish of this group have four "radial canals" as shown in the specimen at the bottom. This one had six, two mouths and eight frilled lobes about them.

kind of light that causes spoilage.

Experiments upon rice bran and rice polish exposed to various kinds of light showed that they became rancid when kept under blue, purple, blue-green, yellow and various shades of red filters. But Mr. Coe found that a green filter, which approximates the chlorophyll coloring matter of the green leaf, and a red filter that absorbs practically all the light, prevents or delays the oxidation and rancidity of the oily portion of the material tested.

A U. S. patent allowing use of the discovery by the public has been applied for by Mr. Coe, who predicts that the principle will prove of great economic value to producers of package foods.

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ARCHAEOLOGY

Hollow Log Coffins Found In Four-Story City of Dead

A FOUR-STORY CITY of the dead, recording a hitherto unsuspected settlement of high cultural level that flourished during the early middle ages near the site of the Baltic city of Memel, is described in the German scientific journal *Die Umschau* by Dr. Carl Engel of Königsberg, East Prussia.

In this cemetery the dead were buried at four levels. The oldest graves in the lowermost level, contained skeletons in coffins made of hollowed-out logs. The burials of the upper three levels showed that cremation had come into use among this early Germanic people, for they consisted of little wooden caskets containing only the charred remains of human bones, together with funeral gifts of bronze and iron ornaments and weapons. The whole series, from lowermost to upper, represents a stretch of over half a thousand years, from the sixth to the eleventh century A. D. Nothing even approaching this find in number of burials or in richness of funeral gifts has ever been found by archaeologists working in the East Prussian region.

The log-coffin burials of the lowermost layer give the best picture of the funeral customs. The men were buried with the full equipment of warriors; a sword before the breast, a dagger at the left side, and at the right the points of several spears or lances. There are no ornaments, except for one bronze brooch necessary to hold the garments.

There are plenty of ornaments in the women's graves, however. The skeletons are fairly loaded with necklaces, bracelets and rings. Two brooches were required for their garments.

As for their hair, they wore plenty of it, and apparently piled it high on top of their heads, to judge from the length of the long bronze arrow-like hairpin found with every female burial. Many of the women's skeletons hold, on what were once their laps, well-made bone combs: long locks required long toilettes, then as now. The gentlemen of those days could prefer blondes or brunettes as it pleased them best; for hair of both colors has been found clinging to the long hairpins.

When the practice of cremation came in, there came with it the custom of burying the body of a goat or sheep under the little casket of burned bones, to supply the departed with provisions for his long journey. A few of these casket burials, apparently those of men of importance, were made on the bodies of horses. In one or two cases, the horse was buried upright, with the casket on its back, as though the dead chief's followers expected him to ride on "West."

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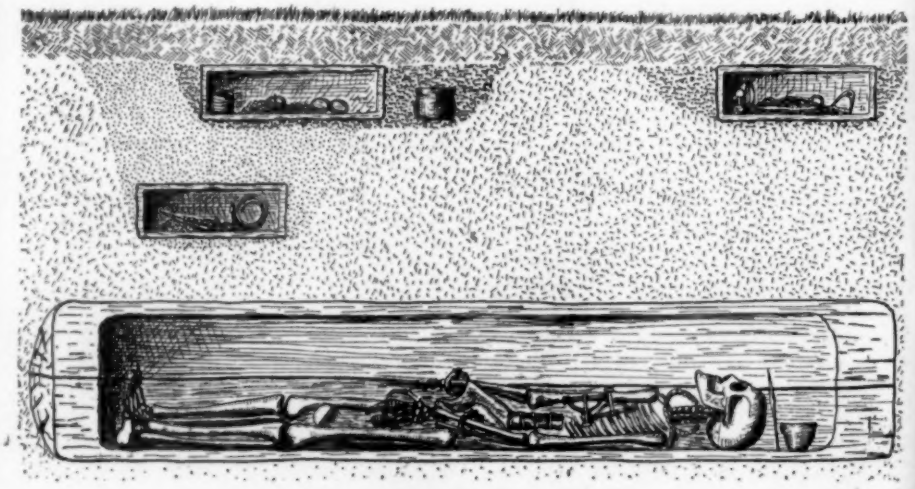

THREE FLOORS OF DEAD CITY

Diagramatic reconstruction of a part of the Memel valley cemetery, showing three of the four burial levels. In the log coffin in the lower level is the skeleton of a woman, loaded in costume jewelry. In the little caskets in the upper levels are the charrd bones and ornaments of cremated bodies of the later days.

ASTRONOMY

Miss Ames' Death Interrupts Surveys of Universes

MISS ADELAIDE AMES, Harvard College Observatory astronomer who was drowned last week in a New Hampshire lake, had just finished the most complete and uniform study of distant universes of stars ever made. In this study of galaxies outside our own universe she collaborated with Dr. Harlow Shapley, director of the observatory, and the report is now in press.

Miss Ames and Dr. Shapley made an extensive catalog based on precise and uniform observations embracing every discovered galaxy or outside universe down to the thirteenth magnitude and the conclusions drawn are expected to have an important bearing on astronomical theories.

Miss Ames had been research assistant at the Harvard Observatory since 1923. She was a Vassar graduate, held a master's degree from Radcliffe, and she was secretary of the International Astronomical Union local committee preparing for the Harvard meeting to be held early in September. Miss Ames acted as delegate to the Leyden meeting of the union in 1928.

Miss Ames published in 1931 a catalog of nearly 2800 external galaxies in the constellations of Coma and Virgo. The survey is an extensive analysis of the number, magnitude, sizes, and classification of these outside universes. Miss Ames had also published with Dr. Shapley a series of notes on the Coma Virgo cloud of galaxies.

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PHOTOGRAPHY

Color Photographs Easily Made by New Process

Ordinary Camera With Two Negatives and Two Prints Makes 3-Color Picture Reproducing Hues of Nature

BEAUTIFUL color photographs, suitable for framing or placing in the album, can now be made by amateurs using an ordinary plate camera.

Nearly fifty years ago trichromatic color photography, requiring three plates, special and expensive cameras and intricate processing, gave faithful photographs in colors. It was successful but too complicated for popular use.

Frederic E. Ives, who obtained the first convincing results, invented special cameras and processes and has received high honors for his work in this field. And now Mr. Ives, one of the great American inventors, has developed a successful method of color photography that uses only two negatives exposed in a conventional camera and only two "gaslight" prints cemented together.

Mr. Ives is one of America's industrial revolutionists. He is father of the half-tone process of photo engraving and every one of the thousands of photographic pictures in magazines and newspapers is a reminder of his contribution to civilization. His genius has promoted greatly many other phases of photography.

His practical solution of making polychrome photographs is, as he told me himself, "reminiscent of Columbus' method of standing an egg on end." He has been amused when showing his two-plate-two-print color photographs to experts without explanation to have them accept them as notable examples of the conventional three-negative-three-print process.

Negatives are made in a way similar to the two-color process that has been used in commercial motion pictures but in the printing process the combination of three colors, not two, is secured. Instead of printing in blue and red only and losing the greens of foliage and the yellows and oranges of the original, Mr. Ives has obtained faithful color reproduction superimposing a print that shades from red to yellow upon a blue-tone print from the red negative.

Blue skies, foliage greens, red, orange and yellow fruits and flowers, brown, auburn and golden hair, brown and blue eyes, blond and brunet flesh tints are differentiated with astonishing fidelity.

This is Mr. Ives' latest gift to photography which he has enriched greatly in his life that has already extended over three-quarters of a century. He is not exploiting the new process and those interested in making color photographs will find further information in his article in the April issue of the Journal of the Optical Society of America, and very detailed operating instructions in a forthcoming issue of *The Camera*. No elaborate laboratory is necessary. Mr. Ives worked out the process in the kitchenette of his Philadelphia apartment.

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PSYCHIATRY

Alcoholic Mental Disease Increasing Since Prohibition

A DEFINITE increase, especially among very young people, of cases of alcoholic mental disease and the development of a new type of this condition have taken place since 1920, Frederick W. Brown, director of the department of statistics of the National Committee for Mental Hygiene, reports in the *Mental Hygiene Bulletin*.

Mr. Brown has analyzed figures from the Census Bureau and from the Statistical Bureau of the New York State Department of Mental Hygiene and reports from superintendents of state hospitals for mental disease.

"An examination of certain trends among alcoholics before and after the enactment of prohibitive legislation indicates that the problem is increasing in magnitude and consequently in seriousness," Mr. Brown said.

"During 1919 and 1920 the sale and use of intoxicating liquor was restricted to a degree that brought about a marked reduction in alcoholic mental disease," he found. "Since then, however, there has been a definite increase, the rates per 100,000 general population showing a jump from 1.9 in 1923 to 2.6 in 1930 for alcoholic mental disease, and from 0.4 in 1926 to 1.5 in 1930 for alcoholism without mental disease."

A new type of mental disease is observed by some hospital superintendents which did not exist before prohibition. In this the alcoholic state is accompanied by a poisoning, often with destruction of nervous and organic tissue. Extreme cases of this type suffer from violent mental disturbances and die within a short time without regaining a normal mental state.

More young patients are admitted than formerly, one hospital reporting during the past year an unusually large group of patients of high school age.

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FORESTRY

Bricks Instead of Trees Used For Replanting Forests

PLANTING forests by the brick instead of by the tree is a new method of forestry developed in Norway, according to Prof. Svend Heiberg of the Department of Silviculture of the New York State College of Forestry who recently returned from Europe where he had been studying reforestation methods under a scholarship of the Charles Lathrop Pack Forestry Trust.

The seed bricks, or briquettes, Prof. Heiberg states, are made of good soil and are 1½ by 1½ inches in size. Three or four seeds are placed in one end near the surface. The briquette is then dipped in paraffin except the side in which the seeds have been placed. The result is an easily transported product, which can be placed in the ground by means of a special instrument designed for the purpose. A machine can turn out 16,000 of the briquettes in a day.

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CHILD STUDY

Baby Learns to Walk

'Tis a Long Road to the First Step, But All Babies Travel It In A Systematic, Scientific Way, a Recent Study Shows

By MARJORIE VAN de WATER

BABY'S first step!

What a thrill it gives even the most indifferent observer to watch this symbolic start on the road to adult independence! It is quite as exciting for the parents as for the infant, and it comes to the older person as an even greater surprise.

For to the child the first step is by no means the beginning of independent locomotion. Almost from the very hour of his birth, he has been preparing himself for this moment. All the while he has been gaining gradual but steady progress toward this goal of self-directed movement which is to bring the whole world within the reach of his inquisitive hands. In less than two years —perhaps not much over a year—he has changed from a little mite lying curled up with knees under chest and back hunched, unable to lift his head, to a confident little adventurer starting off boldly, erect on his own two feet.

For the benefit of parents and others who wish to watch the progress of children along this path of development, Dr. Mary M. Shirley, of the Institute of Child Welfare at the University of Minnesota, has made a careful study of twenty-five babies during the whole first two years of their lives. She has, from this observation of individuals, charted the principal landmarks of the normal, healthy infant's progress in locomotor development. The complete report of her research is contained in a new book, "The First Two Years."

One of the very first efforts made by the human infant to change or modify his environment is a kick. The adult who does nothing but kick when things go wrong is making use of the abilities which he had available fully developed at birth.

The kicking of the young infant is not always a mere thrashing of the feet in air, but may be a good vigorous punt against whatever object is near. Young Don, one of the babies studied, when only two days old kicked the examiner quite vigorously. And when Virginia Ruth was but three weeks of age she kicked so hard against the observer's abdomen that she pushed the nursery table on which she lay a few inches in the opposite direction.

Another ability which the infant has at birth is that of turning the head to one side when he is lying on his back. Turning the whole body over is quite another story. Six of the twenty-five babies were seen to make the turn from back to side between the ages of one and eleven days, but in general the newborn must perforce lie in whatever position he is placed. He will not be able to roll over freely until he is about seven months old.

If he is put on his back he will have knees and elbows flexed, fists closed and up about level with his shoulders. If laid on his stomach, he remains in a posture which Dr. Edith Boyd, Dr. Shirley's collaborator, aptly named "Mohammedan prayer." Knees hunched up under him, arms flexed, hands or fists up close to mouth, and the face turned just enough to leave the nose free for breathing. Most babies outgrow this prayer posture by three or four weeks, but with some it persists much longer. It gradually gives way as the legs are straightened out. For some time the knees remain bent at right angles even though they are not drawn completely up to the chest.

Uncurling

This quiet process of uncurling might really be called the very first step toward becoming an upright two-footed animal.

The first active advance comes when baby can lift his own head from the prone-on-the-stomach position and take a look around at his world. He may be able to do this momentarily during the first or second week. The average age at which he can lift it up and hold it up is three weeks. By seven weeks, three-fourths of the babies had developed this skill.

At one month, then, your baby may be able to lift his head. Not until he is two months, however, is he likely to lift his chest up. For many weeks he seems to stay at this level of development except that he can hold the pose for a longer time and gradually learns to delight in digging his toes into the blanket and perhaps giving a little push or squirm.

At some time near the age of three months, you will notice that baby pushes vigorously with his feet against the table edge or any other convenient firm object. If then you hold him so that his feet can touch the table top or floor, you can see the very beginnings of walking.

At this stage the child will make no attempt to stand or hold his own weight or any part of it. He will however step lightly on his toes, taking little dancing steps which may even result in the covering of some ground.

Record the First Steps

If you like you may preserve a record of these first forerunners of the first step, as Dr. Shirley did. This is how it is done. Oil baby's feet with ordinary olive oil, and let him take his little steps along a strip of white paper. Then brush the paper over with a powder of lamp black, graphite, and powdered acacia. There you have the tiny prints standing out clearly in black, and without any muss around the baby. In general, the baby delights in walking the paper path. Dr. Shirley had one baby object because the oiling tickled, and a few were disturbed by the straight paper path, but most of them delighted in it as a fascinating game.

At four months, your baby may give you some coöperation by stiffening his body when you pick him up. By this time also it is probable that his knees have at last straightened out from their prenatal flexed position.

By five months, you may expect him to sit up on your lap or to sit up supported by pillows. At about this time, too, he may make his first move toward raising himself. This is to lift his head and shoulders clear of the bed from a position on his back. Maybe he will do this as he holds up his arms for you to lift him. Or maybe just to get a better look around.

Not all the babies were observed to lift the head this way. But little Martin often lifted head and shoulders and held them so for as long as a half minute. Try the stunt yourself, and you will be convinced of the strength in neck and

back muscles required for the feat. But with all this strength and control in the head and neck muscles, the child is not yet ready to sit alone.

Muscular development begins at the head and works gradually down, Dr. Shirley has found. At birth the baby has no control over his head and neck muscles. If you hold a newborn, you must be sure to support the whole length of the body including the head, Dr. Shirley warns. In a short time he achieves control over the head and neck muscles. After that it is sufficient to support the full length of the spine up to the nape of the neck. Later you need hold him only as high as the shoulder blades. Still later about the ribs and the small of the back.

Baby Tells of Progress

The baby himself will tell you of his development by his own insistence upon using his muscles. When he raises his own head and shoulders, you know that these parts have come under control.

When the control has progressed as far down as the midribs, skill with the arms begins to develop. The child can then reach for and grasp his toys successfully.

When he can almost, but not quite, sit alone, it is the lower part of the trunk that gives away. Sometimes you may see him make an effort to keep his balance by bending far forward. Then it is not possible for him to raise himself again, and he must suffer the indignity of rolling over and starting again. He must attain a great deal of skill in sitting before he can bend and straighten back up again. The average baby is not able to sit alone until he is eight months old.

Meantime he has been making progress toward crawling. After many weeks, usually several months, of practice in pushing the chest up, he will one day try pulling his legs up frog-fashion and then kicking them out suddenly. This effort looks very much like the old-fashioned swimming breast stroke, and Dr. Shirley calls it the swimming stage. It is accompanied by a great straining and reaching toward the desired object, but —sad to relate—the progress, if any, is usually backward. Because the abdomen is not lifted off the floor, and the arms and legs work mostly at cross purposes, the net result is usually zero, but it is excellent exercise. This swimming stage is reached by the average baby at six months.

Most babies will devise some method of making some slight progress while still unable to lift the abdomen from the floor. Many rocked back and forth on their stomachs. Dr. Shirley put the average age for making some progress in this laborious fashion at about nine months.

The advanced stage of creeping on hands and knees is attained by the average baby at about eleven months.

At about this time also he has reached a very important stage on the road to walking—he is able to stand with the help of an outstretched adult hand or the support of furniture or adult clothing. This stage is a good index of when the child will walk. The sooner it is reached the soooner the baby will walk alone, and the later it comes the more retarded he will be. For the average baby, this level is first reached at seven months and it lasts until ten months.

If the child is precocious and begins standing at an earlier age—and many of them do—the parents are likely to worry for fear he will overtax his pliant bones and become bow-legged. Young baby has no such worries, however. In fact he will outwit mother's most carefully thought out measures to prevent this activity. Every firm object, and some that are not so firm, will serve him as a "chinning bar" for the purpose of pulling up to his feet. The crib side, the play pen, the davenport, mother's dress, unfortunately even the dining room table cloth will be pressed into his service as something to pull against.

Will Walk Without Help

He will also walk, whether assisted or "taught" or not, Dr. Shirley has found. For the furniture is "the baby's all-but-human helper, his rod and his staff as it were." He will cling to it and make his way about by progressing from one piece to another or by following the wall, quite independent of adult aid.

These stages of creeping, standing with help, and walking with help are not separate, but run parallel. The child does not outgrow one and discard it as he progresses to the next. During a long period he is content to use any and all means he has at his command for getting about.

It is still a big jump, however, to the very grown up stunt of standing and walking alone, which will not be possible for the average child until the age of about 14 or 15 months.

"Parents are likely to expect the transition from walking with help to walking alone to take place within a few weeks," Dr. Shirley says. "Quite to the contrary, this is usually a long, drawn-out period, and the efforts of parents to hasten or retard it are usually without avail."

This does not mean, though, that your baby is not gaining in all the months that he must hang on to something in order to walk. Dr. Shirley's footprint records tell the story of continuous development over this period. Speed of walking is gradually increasing. The length of the step is also getting greater and the angle straighter. The feet are being set down with greater regularity one after the other, gradually eliminating hesitation and false patting of the ground.

The angle of the foot is changing, too. Some babies are pigeon-toed when they start walking. More toe out. But as proficiency in walking is developed, the feet gradually straighten.

During all this time, too, invisible changes are going on in the muscles and the bones and the mind and courage of the child.

At last the stage is set. The big moment has come. His Majesty Infant takes what parents and other foolish adults misguidedly call the first step.

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Science News Letter, July 9, 1932

THE VERY BEGINNING

Baby retains the "Mohammedan prayer" position, on the left, during the first few weeks of life, but when only about a month old he begins to look around a bit.

NUTRITION

Leafy Vegetables Test As Good Anemia Tonic

IF LEAFY vegetables can be made popular food in the South, the nutritional anemia now prevalent in many rural districts may be decreased.

This is the moral from a scientific study on diet reported before the American Home Economics Association meeting in Atlanta. Miss Olive Sheets conducted the feeding experiments at the Mississippi State College, using anemic young rats for her subjects.

In some parts of the rural South, the diet contains too little iron, Miss Sheets explained. This produces nutritional anemia. Since the climate in the southeastern United States is suitable for gardens nine to ten months of the year, Miss Sheets determined to conduct tests to see whether vegetables containing iron would prevent or alleviate the anemia.

So far, she reported, she has studied mustard, turnip tops, spinach, collards, two varieties of lettuce, and also cow peas. These vegetables "have decided anti-anemic potency," Miss Sheets said. Spinach, one of the best iron foods, is seldom eaten by southern rural people, she stated.

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CHEMISTRY

New Paraffin Process Preserves Bodies Forever

BODIES of dead persons can be kept, life-like and without decay, for an indefinite time—probably for thousands of years—by a new process of preservation using paraffin, developed by Prof. Edmond J. Farris of the Medical College of the State of South Carolina. Prof. Farris's process is described in the technical journal, *Science*.

Corpses preserved by the paraffin method do not have the shrunken, dried appearance of Egyptian mummies, but are natural in both form and color, Prof. Farris says.

The process is essentially similar to one used for many years in biological laboratories for the preservation of small bits of plant and animal tissue, and lately employed also by Dr. G. K. Noble of the American Museum of Natural History in New York for making vividly lifelike mountings of small snakes, lizards, etc. But up to the present it has not been used for so large an object as a human cadaver.

Four steps are involved: fixation or embalming, dehydration, clearing, and infiltration with paraffin. Embalming with a solution of formaldehyde, sodium borate and common salt, injected through the blood vessels, prevents the loss of color and form during the process. Then the body is soaked in alcohol solutions of increasing strength to get the water out, or dehydrate it. Then comes the "clearing" process, a soaking in an oily liquid called xylol, with about 5 per cent. of carbolic acid added. Finally comes the infiltration process, in melted paraffin, after which the excess paraffin is removed with xylol and running hot water. The total time consumed in all the steps is about seventy days.

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CHEMISTRY

Vitamin G Pronounced Twins By New Researches

ONE OF the vitamins is twins.

Vitamin G is now known to consist of two factors, tentatively called X and Y, which are as necessary to each other to produce the vitamin G effect as Siamese twins are to each other.

This discovery was made by Prof. H. C. Sherman of Columbia University and Miss Hazel Stiebeling then of Columbia but now at the U. S. Bureau of Home Economics.

Vitamin G is the anti-pellagra vitamin, that prevents the development of the disease of malnutrition that has often been prevalent in the South among poor whites and negroes whose diet consists largely of corn pone, molasses and "fat back" pork. It was identified by the late Dr. Goldberger of the U. S. Public Health Service and called by him the P-P or pellagra-preventive factor. The British have named it the B2 vitamin because it once was considered a part of vitamin B.

The Columbia University investigators split the G vitamin into two chemical parts. They set feasts before rats that had varying amounts of these X and Y factors. They watched them and weighed them to see how they grew. It was found that X and Y are both necessary. Double doses of Y without any X caused the growth curve to flatten out slowly, showing that lack of X prevented proper growth after the rats had eaten the food for some time. If two doses of Y were placed in the ration without any X factor, the rats did not attain proper growth from the very beginning.

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IN SCIE

PLANT PHYSIOLOGY

Plants Use Sugar to Save Selves From Drought

SUGAR is the means of saving plants from drought, thickening their sap so that the ardent sun and the drying winds cannot pull all the water out. This is indicated by physiological researches reported by Dr. I. Vasiljev of the Institute of Plant Industry in Leningrad.

Experimenting with wheat plants under varying conditions of drought, Dr. Vasiljev found that as drying proceeded, increasing amounts of starch and other insoluble carbohydrates were converted into sugars. When water contions improved the process was reversed and the sugars again became insoluble carbohydrates of more complex structure.

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ARCHAEOLOGY

Palace of Unknown Ruler Found in Persia

A PREHISTORIC palace built for an unknown ruler of an unknown people in Persia, more than 4,000 years ago, has been discovered at Tepe Hissar, according to a cable dispatch from Dr. Erich Schmidt. Dr. Schmidt is field director of the joint expedition of the University of Pennsylvania Museum and the American Institute for Persian Art and Archaeology.

Reporting to the University Museum in Philadelphia, Dr. Schmidt says the palace shows that a town existed in this northwestern part of Persia as early as 2000 B. C. Last October, the same expedition found under a huge mound at Tepe Hissar the remains of 200 people of an unknown race, buried with many beautiful possessions. The palace now discovered appears to mark the center of their town, and the archaeologists have hopes of reconstructing the life of townsfolk in Persia in that ancient time.

Dr. Schmidt also reports the finding of splendid alabaster vessels, a copper dagger with a silver grip, and many ornaments of gold, silver and agate.

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E FIELDS

ENGINEERING

Modernistic Building Shows Achievements of Science

See Front Cover

STRIKINGLY modernistic in design and construction is the huge Hall of Science building in Chicago which has been dedicated as the key structure for the Century of Progress Exposition next year. Its two floors and mezzanine, containing nine acres of exhibit space, will illustrate the development of the sciences and their application during the past 100 years. The tower is 176 feet high and contains a 25 tone carillon.

Unusual illuminating effects are being achieved to accent the unique architectural features. The tower is bathed in a blue and red light at night. In the wall surface facing a courtyard, triangular bays extending the full height of the facade have been installed with a facing perforated in a pattern representing an abstract design of tree branches. An ever-shifting play of colors moves through the perforated pattern to provide a unique effect. The faces of huge pylons which guard the north approach to the building are lighted with indirect Neon floods. The lighting effects inside are equally novel.

The Hall of Science is set on the edge of a beautiful lagoon that opens into Lake Michigan. It is a temporary structure, planned for the 150 day duration of the exposition.

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HOME ECONOMICS

Chair For Potato Peeler Increases Her Efficiency

THE HOUSEWIFE or hired cook who sits down comfortably in a kitchen chair to peel potatoes for dinner has the right idea. If she stood up or perched on a stool, she would waste energy on the potato peeling job.

This new report on kitchen efficiency was presented to the American Home Economics Association by VeNona W. Swartz who described scientific experiments at Washington State College.

College students, their teachers, and a group of housekeepers peeled potatoes in 175 experiments, Miss Swartz said. As each worker peeled, the amount of oxygen she consumed was determined by means of a gas mask and a bag strapped to her shoulders.

Peeling potatoes is light work, Miss Swartz reported. It requires an increase of about 50 per cent. in energy expenditure over a state of rest. Sitting comfortably in a kitchen chair is the best energy economy for this task, she reported. None of the workers saved energy by sitting on a kitchen stool. Two workers used more energy when they worked on stools than when they stood.

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ENGINEERING

Coal Gives Cheaper Power Than Free Falling Water

WHY do industries continue to build steam power plants and buy coal to burn in them when millions of apparently free horsepower-hours are wasted every year by water as it falls from the mountains to the sea?

This question, often asked by the layman, was answered by K. M. Irwin and Joel D. Justin, engineers of Philadelphia, in a report to the American Society of Mechanical Engineers.

Only the most economical plant to build and operate is installed, and in some parts of the country where fuel is cheap and favorable hydroelectric sites are available, from 25 to 40 per cent. of the installed capacity of a system may use water power, the report stated. However, in other regions where fuel is somewhat more costly, but where there are very favorable hydroelectric sites with relatively cheap storage, from 60 to 70 per cent. of a system's capacity may be in water power. In certain sections of Canada the ratio is even higher.

The fact that engineering development and lowered cost of fuels has approximately halved the cost of steam-produced electric power since 1905 was also cited as an important reason for the continued installation of steam plants. In addition, Mr. Irwin and Mr. Justin pointed out that hydroelectric sites are often far from the factories and homes for which their power is desired. Expensive transmission lines, frequently as costly as the plant itself, must be built.

Another great disadvantage of the hydroelectric installation is the fact that most streams carry many times as much water in winter as they do in summer.

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PSYCHIATRY

Half of Mental Disease Caused by Focal Infection

HALF of the patients in hospitals for mental disease owe their illness to definite changes in the tissues of their brains brought about by chronic infections of teeth, tonsils, sinuses or digestive tract, in the opinion of Dr. Henry A. Cotton, director of research at the New Jersey State Hospital.

By eliminating the chronic infections in these patients, Dr. Cotton and associates were able to double the number of recoveries at the hospital during the last thirteen years. Two thousand instead of one thousand patients recovered during that period. Incidentally the State saved for at least six years $1,000 a day for the maintenance of these patients, leaving out of consideration the large amount saved in cost of construction of a new building to care for that number.

Dr. Cotton began working along this line back in 1905 in Munich. At that time he found there were definite changes in the brain in the functional disorders, which he says afflict one-half of the patients in mental disease hospitals. Still later he found that it is chronic infection which produces a poisoning that destroys the brain tissue.

In order to prevent the occurrence of mental disorders as well as many physical disorders Dr. Cotton advocates searching for and cleaning up chronic infections in children.

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ARCHAEOLOGY

500 Axes Found in Stone Age Hardware Store

A WHOLESALE stock of fully 500 stone hand-axes made by men of the Old Stone Age has been found by Miss Gertrude Caton-Thompson, British archaeologist, excavating the floor of the Kharga Oasis, Egypt, for the Royal Anthropological Institute.

The axes were in mint condition, as if never used. All were highly glazed from long exposure to water-borne sand. The tools in this old Egyptian "hardware store" offered a variety of shapes to choose from. They ran in size from approximately eight inches in length to miniature axes not over an inch and a half long. Flake implements and the flint cores from which they had been made were found with the axes.

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ANTHROPOLOGY

Oldest Americans May Have Lived and Hunted in Nebraska

Three Discoveries of Fossil Beasts With Stone Weapons Are New Clues to Ancient Man

THE ELUSIVE earliest inhabitants of America, whom science is eagerly seeking, have been sighted in Nebraska, according to reports of no less than three separate discoveries.

Dr. W. D. Strong of the Bureau of American Ethnology, a specialist in the archaeology of the central plains, has visited all three sites. In a statement to Science Service he said that the discoveries, if accepted as authentic, should be of major importance, in view of Nebraska's strategic location within the region covered by the great glaciers in the Ice Age. Conservative scientists maintain that existence of men in this country as far back as glacial times can be proved only by finding human relics below undisturbed glacial deposits.

Two of the Nebraska discoveries were made by students from the University of Nebraska, specializing in geology or paleontology, and conducting field parties for the State Museum. Led by Bertrand Schultz, they dug into a bank in the South Loup Valle near Cumro, to uncover a bison skeleton. Close by a rib bone lay a beautifully chipped point of black flint, which Mr. Schultz removed.

Dr. Strong declares that, from examination of the site, he is convinced that Mr. Schultz' account of how the weapon was found is accurate. The important question is to fix the time when the bison and the hunter lived. The key to age is the yellow soil deposited sixteen feet thick over the layer of dark earth containing the bison and weapon. This yellow soil is of the kind known as loess, and may have been deposited before the last glaciation. Mr. Schultz holds the view that it was so deposited. Dr. Strong's verdict is that "while possibly well founded, these conclusions await confirmation by more experienced students of Pleistocene deposition in the Great Plains region."

The second student discovery was made sixty miles from the first, on the banks of the Platte River, near Grand Island. As a party led by Schultz was unearthing a fossil bison, a chipped point of blue-gray flint came into view under a cluster of ribs and vertebrae. This time, the students photographed the weapon where it lay, and then removed it together with the impression preserved in the form of a small block.

"It is evident that these two discoveries are very important," said Dr. Strong. "In all probability they represent a very early and hitherto unknown Nebraska hunting culture."

The third and most recent discovery was made near the town of Angus. A. M. Brooking, who reported it, said that a mammoth was being excavated when Junior Brooks observed a stone weapon under the shoulder blade. The point was removed and found to be of crude workmanship. Mr. Brooking described it as similar to the points found with fossil bison at Folsom, New Mexico.

The mammoth bones found near Angus lay under almost sixteen feet of soil which some observers believe may date from the early Pleistocene age. One scientific observer pointed out that if the weapon found with this mammoth was indeed made in the early Pleistocene age it would mean that hunters were pursuing American bison as far back as 300,000 years ago. Some scientists, however, have expressed themselves as doubtful whether the weapon itself was as old as the mammoth.

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CHEMISTRY

Potent Chemical Seems To Control Yeast Growth

A POTENT chemical which seems to control and make possible the growth of yeast has been discovered in a wide variety of living materials by Dr. Roger J. Williams, biochemist in the University of Oregon. In a report to the American Chemical Society, it appears that a yeast plant will not grow, even when given its full quota of sugar, phosphate, salt and other fundamental materials needed to build new structures unless the special growth substance be present. This substance does not seem to belong to the so-called vitamin class.

Yeast was chosen because it grows rapidly, and, further because its progress may quickly be reckoned by count of the simple cells under the microscope. For some years biochemists have vaguely understood that a certain organic material called "bios" fostered the growth of yeast. The investigations of Dr. Williams indicate that a relatively simple chemical, contained in the "bios" and elsewhere, is the real operating principle. While the substance has not yet been isolated in crystalline form, its behavior in purified solution indicates that its formula is less bulky than that of common sugar. While part of its chemical structure shows that it is like sugar, other reactions show it to be a weak acid.

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PUBLIC HEALTH

Health Officers Plan For Disaster Relief

A PLAN for a permanent organization in each state and province of North America that would be ready at any time to meet disaster in the shape of floods, hurricanes, tornadoes, earthquake, fires, explosions and epidemics was presented to the Conference of State and Provincial Health Authorities of North America by Dr. E. L. Bishop, state health officer of Tennessee and chairman of the Conference's committee on disaster relief.

Under this plan there would be a committee in each state or province which would correlate the work of various agencies for disaster relief. The executive direction of the work in the various lines would be left to the agencies concerned. The medical service necessary would generally be supplied by the local physicians and hospitals.

Relief needs in the way of food, clothing, shelter and economic rehabilitation would be supplied by the American Red Cross. Health protection and disease prevention must be furnished by the public health authorities. The permanent relief organization should consist of the governor, the adjutant general, the state health officer, the Red Cross field representative, the state commander of the American Legion, the Legion Auxiliary, and others, according to the plan formulated by Dr. Bishop's committee.

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CHEMISTRY

Three Common Elements in Group IV

"A Classic of Science"

Tin and Lead are Among the Oldest Metals Known to Man Silicon, Recently Isolated, is Familiar in Sand: SiO_2

The Tin Islands

THE GEOGRAPHY OF STRABO, literally translated, with notes. The first six books by H. C. Hamilton, Esq., the remainder by W. Falconer. In three volumes. London: 1854. (The Geography of Strabo dates from about the years 17 to 23 A. D.)

THE CASSITERIDES are ten in number[1], and lie near each other in the ocean towards the north from the haven of the Artabri. One of them is desert, but the others are inhabited by men in black cloaks, clad in tunics reaching to the feet, girt about the breast, and walking with staves, thus resembling the Furies we see in tragic representations.[2] They subsist by their cattle, leading for the most part a wandering life. Of the metals they have tin and lead; which with skins they barter with the merchants for earthenware, salt, and brazen vessels. Formerly the Phoenicians alone carried on this traffic from Gades,[3] concealing the passage from every one; and when the Romans followed a certain ship-master, that they also might find the market, the ship-master of jealousy purposely ran his vessel upon a shoal, leading on those who followed him into the same destructive disaster; he himself escaped by means of a fragment of the ship, and received from the state the value of the cargo he had lost. The Romans nevertheless by frequent efforts discovered the passage, and as soon as Publius Crassus, passing over to them, perceived that the metals were dug out at a little depth, and that the men were peaceably disposed, he declared it to those who already wished to traffic in this sea for profit, although the passage was longer than that to Britain.

Assaying Lead and Tin

GEORGIUS AGRICOLA DE RE METALLICA, Translated from the First Latin Edition of 1556 with Biographical Introduction, Annotations and Appendices upon the Development of Mining Methods, Metallurgical Processes, Geology, Mineralogy & Mining Law from the earliest times to the 16th Century, By Herbert Clark Hoover and Lou Henry Hoover. Published for the Translators by The Mining Magazine, Salisbury House, London, E. C., 1912.

Lead ore may be assayed by this method: crush half an *uncia* of pure lead-stone and the same quantity of the *chrysocolla* which they call borax, mix them together, place them in a crucible, and put a glowing coal in the middle of it. As soon as the borax crackles and the lead-stone melts, which soon occurs, remove the coal from the crucible, and the lead will settle to the bottom of it; weigh it out, and take account of that portion of it which the fire has consumed. If you also wish to know what portion of silver is contained in the lead, melt the lead in the cupel until all of it exhales.

Another way is to roast the lead ore, of whatsoever quality it be, wash it, and put into the crucible one *centumpondium* of the concentrates, together with three *centumpondia* of the powdered compound which melts ore, mixed together, and place it in the iron hoop that it may melt; when it has cooled, cleanse it of its slag, and complete the test as I have already said. Another way is to take two *unciae* of prepared ore, five *drachmae* of roasted copper, one *uncia* of glass, or glass-galls reduced to powder, a *semi-uncia* of salt, and mix them. Put the mixture into the triangular crucible and heat it over a gentle fire to prevent it from breaking; when the mixture has melted, blow the fire vigorously with the bellows; then take the crucible off the live coals and let it cool in the open air; do not pour water on it, lest the lead button being acted upon by the excessive cold should become mixed with the slag, and the assay in this way be erroneous. When the crucible has cooled you will find in the bottom of it the lead button. Another way is to take two *unciae* of ore, a *semi-uncia* of litharge, two *drachmae* of Venetian glass and a *semi-uncia* of saltpetre. If there is difficulty in melting the ore, add to it iron filings, which, since they increase the heat, easily separate the waste from lead and other metals. By the last way, lead ore properly prepared is placed in the crucible, and there is added to it only the sand made from stones which easily melt, or iron filings, and then the assay is completed as formerly.

You can assay tin ore by the following method. First roast it, then crush, and afterward wash it; the concentrates are again roasted, crushed, and washed. Mix one and a half *centumpondia* of this with one *centumpondium* of the *chrysocolla* which they call borax; from the mixture, when it has been moistened with water, make a lump. Afterwards, perforate a large round piece of charcoal, making this opening a palm deep, three digits wide on the upper side and narrower on the lower side; when the charcoal is put in its place the latter should be on the bottom and the former uppermost. Let it be placed in a crucible, and let glowing coal be put round it on all sides; when the perforated piece of coal begins to burn, the lump is placed in the upper part of the opening, and it is covered with a wide piece of glowing coal, and after many pieces of coal have been put round it, a hot fire is blown up with the bellows, until all the tin has run out of the lower opening of the charcoal into the crucible. Another way is to take a large piece of charcoal, hollow it out, and smear it with lute, that the ore may not leap out when white hot. Next, make a small hole through the middle of it, then fill the

[1]The Scilly Islands.
[2]This is probably a description of the appearance of the Druids.
[3]Cadiz.

EVOLUTION

was tested by the records of geology.

Darwin

will discuss the geological record in

THE NEXT CLASSIC OF SCIENCE

large opening with small charcoal, and put the ore upon this; put fire in the small hole and blow the fire with the nozzle of a hand bellows; place the piece of charcoal in a small crucible, smeared with lute, in which, when the melting is finished, you will find a button of tin.

Silicon

ANNALS OF PHILOSOPHY, new series, January to June 1824, Vol. VII. and twenty-third from the commencement. London: 1824. (Proceedings of Philosophical Societies: Royal Society.)

A Letter from Professor Berzelius to the President was read in which he describes the results of various chemical researches in which he has recently been engaged; and several memoirs on which accompanied the letter . . .

The fifth memoir relates to the combinations of fluoric acid. A portion of this memoir now printing describes a method by which the author has succeeded in obtaining the base of silica in an insulated state. It consists in acting by potassium on dry silicated fluate of potash, by which means a mixture of various substances is obtained, which yields hydroguret of silicon by being well washed with water: and when that substance is heated in a crucible the hydrogen is burned off, and the silicon obtained pure. Prof. B. then proceeds to give the results of various experiments upon this substance; among which are the following. It is obtained in various states of aggregation, and its combustibility varies accordingly, it much resembling carbon in this respect: as usually obtained it is combustible when ignited in atmospheric air and in oxygen gas; but in its densest state it may become incandescent in the air without burning. It is very difficult to effect its complete combustion: 200 parts of silicon unite to 208 of oxygen to become silica. It will not burn when heated with nitre, but is brought into combustion by carbonate of potash; a curious circumstance which the author attributes to certain relations of affinities. Silicon burns when ignited in chlorine, forming with it a transparent colourless fluid, having the smell of cyanogen. It is combustible in vapour of sulphur, producing a gray sulphuret, but cannot in this case be completely burned.

Prof. B. next describes the results of the same mode of decomposition as applied to ittria, glucina, and zirconia; giving the chemical habitudes of zirconium, which can be obtained in larger quantities than the bases of the former earths. He then states that he has used the term *fluate* instead of *fluoride* throughout this letter, not because he thinks the President's ingenious theory of the subject less probable than his own (though he has not been able, by his own experiments, to determine which is the true one); but because, as he was writing in a language foreign to him, he wished to employ the plainest terms: and concludes by requesting Sir Humphry to lay the above results before the Royal Society.

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ECONOMIC GEOGRAPHY

Russia Seeks Warm-Water Port As Pacific Gateway for Siberia

Japan's Manchurian Venture Threatens Vladivostok, Now Ice-Free Most of Year, Thanks to Ice-Breakers

Following is the fourth and last of a series of articles on the tangled and vexed situation in the Far East as seen by leading geographers.

A LONG struggle over warm-water ports looms ahead in the Far East. This is the outlook as seen by one of those cautious prophets of science, a political geographer. The geographer is Dr. Isaiah Bowman, director of the American Geographical Society, with headquarters in New York City.

One of Russia's vital requirements in the Far East, he explains, is a port open to her trading ships all the year round. Such a port is known as a warm-water port, to distinguish it from ports that are ice-bound in winter.

Throughout Czarist history, Russian leaders worked to gain warm-water ports for the vast Russian domain, not only in the Far East, but in every other direction. So far as the Far East was concerned, the Czarist regime never completely solved the problem. It was left to the Soviets, and is now one of the key points in Far Eastern strategy.

Russia seemed near a solution of the port problem in the Far East when she gained a twenty-five year lease on Port Arthur and Dairen in South Manchuria, back in the eighteen-nineties. The most southerly seaport in Russia's own Pacific territory, Vladivostok, was at that time ice-bound for the greater part of the year. So it was necessary to look farther south, into another country—Manchuria—for the desired outlet.

But the favorable position which Russia gained in South Manchuria was lost long before the twenty-five year lease was out. The Russo-Japanese War broke, and the outcome was that Russia had to withdraw from South Manchuria, giving up her seaports.

Since then, Russia has concentrated on Vladivostok. She has wrought a complete change in its character, turning the port, to all intents and purposes, into a real warm-water port. This is done by ice-breaking ships that keep the harbor open. As the effectiveness of these ice-breakers has been increased, Vladivostok has come close to being an all-year port. According to advices at the Soviet Union Information Bureau, in Washington, the port is now closed only a few weeks in the year, and the prospect is that Vladivostok will eventually be kept entirely free of ice.

Still, the port problem is far from solution. The Chinese-Eastern Railway,

RADIO

The Science Service radio address next week will be on the subject,

PRODUCE AND PROFITS

by

Dr. H. G. Knight

Chief of the Bureau of Chemistry and Soils of the United States Department of Agriculture

FRIDAY, JULY 15

at 2:45 P. M., Eastern Standard Time

Over Stations of

The Columbia Broadcasting System

which Russia built across North Manchuria as a short cut to Vladivostok, is in the zone of Chinese-Japanese skirmishes. The upheaval in Manchuria, where China, Japan, and Russia all hold stakes in the important railroads, has given Japan new strength. Two new ports are being developed in northern Korea. Russia, holding aloof from the argument, is faced with the unpleasant prospect of finding her commerce on the Pacific more restricted than it has been, as regulations over railroads and seaports tighten against her. Such a situation is not likely to be permanent.

"Vladivostok," says Dr. Bowman, "is a key point in Russian policy, today no less than yesterday and tomorrow. 'Imprisoned Siberia' would be even more shut in than at present if the eastern part of that vast nation were deprived of a port. How to develop that port and its hinterland and yet persuade Japan that Russia is aiming no spear at her, is one of the most acute of the problems that vexes Russia in the Far East today."

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ARCHAEOLOGY

Turquoise-Jade Plaque Found in Warrior's Tomb

MEXICAN archaeologists who are exploring the Mayan tomb they have discovered under the Castillo pyramid, in Chichen Itza, have spied a rare object, a mosaic plaque of turquoise and jade. The plaque is lying in a stone box under other fragile articles not yet removed.

Eduardo Martinez Canton, inspector of archaeology in Yucatan, wired immediate news of the discovery to the Mexican department of archaeology in Mexico City. The bits of blue and green stone that make the pattern of the mosaic are on a decomposed wood base. When the Carnegie Institution discovered such a plaque in Chichen Itza four years ago, a museum preparator was brought from New York to undertake the restoration. A Mexican Museum technician will reconstruct the new plaque.

The tomb under the tall pyramid known as the Castle contains a few crumbling human bones. Turquoised spearheads suggest that the personage buried under the temple was a warrior. The position of the bones indicate that the warrior was not the original occupant of the tomb, but was placed there later.

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VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV

THESE 7 GREAT SCIENTISTS

want to talk to you in your home

DR. ROBERT A. MILLIKAN, Nobel prize winner in physics, leader in scientific thought and head of the California Institute of Technology, speaks on *"The Rise of Physics"*.

DR. JOHN C. MERRIAM, authority on the fossil animals and reptiles of western America, president of the Carnegie Institution of Washington, speaks on *"The Record of the Rocks"*.

DR. EDWIN G. CONKLIN, Princeton University biologist, one of the world's greatest authorities on life processes, speaks on *"The Mystery of Life"*.

DR. KARL T. COMPTON, eminent physicist, president of the Massachusetts Institute of Technology, speaks on *"Science and Engineering."*

DR. LEO H. BAEKELAND, industrial chemist and one of America's industrial pioneers, inventor of bakelite, velox, etc., speaks on *"Chemistry and Civilization"*.

DR. WILLIAM H. WELCH, of Johns Hopkins University, "Dean of American Medicine" speaks on *"The Tubercle Bacillus"*.

DR. WILLIAM M. MANN, director of the National Zoological Park of the Smithsonian Institution, leading authority on animal life, speaks on *"Our Animal Friends"*.

SCIENCE is absorbingly interesting. Scientists bring forth new points of view, new discoveries, new relationships of old discoveries, and thus they themselves are absorbingly interesting as human beings.

Men and women of intellectual curiosity would like to entertain many of these scientists, one by one, in their homes, but this is usually impracticable.

1 So Science Service, Inc., asked seven great scientists to make phonograph records on subjects which fired them with enthusiasm.

2 We asked Durium Products, Inc., to make a price on a set of seven such records which would be low enough to be attractive to purchasers. They did.

3 We got portraits of the scientists. We had these portraits reproduced in photogravure process, each on a sheet of beautiful white gravure paper, size 8½" x 9".

4 On the reverse side of each picture we printed a brief biography of the scientist, together with his complete speech as recorded on the record.

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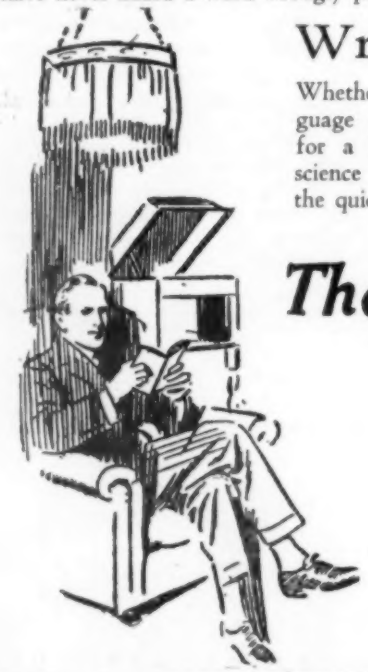

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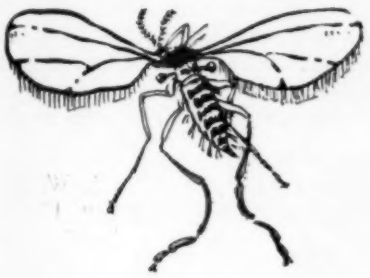
ENTOMOLOGY

NATURE RAMBLINGS *by Frank Thone*



Balancers

IF YOU will catch one of the long legged insects that you frequently find in the house—craneflies, gallinippers, daddy-long-legs, they are called in various localities—you will find, just behind his two wings, a pair of most curious little knobs, that look more or less like the knobs on the end of a tight-rope walker's balancing pole.

In effect, that is what they are. Nobody knows just how they do it, but in some way they act to keep the insect's flight normal and under control. Once a curious naturalist cut one off with a pair of exceedingly fine scissors. The poor cranefly could no longer fly straight, but constantly swung in circles. And when he cut them both off the poor thing flew as though it were drunk or crazy.

These odd little balancers are regarded by scientists as the remains of wings the insects once had. The normal quota of wings for any insect is four. This is very obvious in such groups as the butterflies, grasshoppers and beetles, and almost as evident among the bees and wasps. But the fly family, to which our gallinipper belongs, has only one pair of wings whence its name of "Diptera" which means "two-wings." But in the position that would normally be occupied by the after pair, all flies, mosquitoes, gnats, craneflies, and all other dipterous insects have this pair of protruding knobs. They can no longer use them to fly with, yet they can not fly without them.

Pelicans in flight move their wings in unison, taking their beat from the leader and keeping time with him.

MEDICINE

Diet Protects Growing Teeth, Cleanliness Saves Old Ones

EVIDENCE supporting the theory that acid-producing germs cause tooth decay was presented by Dr. H. E. Friesell, dean of the University of Pittsburgh School of Dentistry, and Dr. J. J. Enright of the Mellon Institute at a special symposium on dental decay held under the auspices of the Pittsburgh section of the International Association for Dental Research.

Diet is of greatest importance while the teeth are being formed and before they are erupted, and the expectant mother and the small child should have plenty of fresh fruits, vegetables, dairy products and preparations or foods containing vitamins A and D, these scientists declared. However, after the teeth are erupted, the conditions in the mouth and particularly the presence of acid and acid-forming bacilli are responsible for dental decay, in their opinion.

Drs. Friesell and Enright studied the effect of acid on extracted teeth and found that it produced decay which could not be distinguished from that occurring naturally. They even examined under a microscope thin ground sections of several hundred specimens of such artificially produced decay. They found that unless the acid strength was greater than that of sour milk, the acid would not produce decay under conditions like those found in the mouth.

The Pittsburgh investigators also studied twenty-three varieties of bacteria found in mouths. Of these only one, the lactobacillus, could stand acid strong enough to produce decay of the teeth. This bacillus itself forms acid from starches and sugars, such as may be in food particles clinging to the teeth. A survey showed that in general progressive decay of the enamel of the teeth was accompanied by the presence of these bacilli in the dental zone and absence of decay was accompanied by absence of massive infection with these same lactobacilli. A careful clinical study at the University of Pittsburgh further showed that measures which would reduce by two-thirds the infection of the dental zone with these lactobacilli also decreased the amount of new tooth decay developing in a year.

Science News Letter, July 9, 1932

A 300-pound piece of stone kitchenware, the property of some unknown American housewife of prehistoric times—long before the days of kitchenette apartments—has been found by the entrance to a cave near Dragoon, Arizona.

This heavy-weight household article is one of the discoveries announced by Bruce Bryan, archaeologist of the Southwest Museum, just returned from exploring caves in the Dragoon Mountains in southeastern Arizona.

Science News Letter, July 9, 1932

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First Glances at New Books

Medicine

MAN AND MEDICINE: AN INTRODUCTION TO MEDICAL KNOWLEDGE—Henry E. Sigerist—*Norton,* 340 p., $4. Translated by Margaret Galt Boise. Introduction by William Henry Welch. This most unusual book covers medical history, health and disease, medico-legal and medico-economic problems and mental hygiene—topics often written about but presented here in a new and altogether charming fashion. The book is based on lectures to beginning medical students, and is fortunately not too technical to be enjoyed by the intelligent lay reader.

Science News Letter, July 9, 1932

Zoology

GENETIC, DISTRIBUTIONAL, AND EVOLUTIONARY STUDIES OF THE SUBSPECIES OF DEER MICE (*Peromyscus*)—F. B. Sumner—*Bibliographia Genetica, The Hague, Holland,* 106 p. Probably no mammal has ever had the exhaustive study bestowed upon it that Dr. Sumner has given to *Peromyscus.* The completeness of his data give it a valid claim to be considered as a "good example" by zoologists in a number of sub-disciplines.

Science News Letter, July 9, 1932

Botany

COLLEGE BOTANY—W. H. Eyster—*Long and Smith,* 695 p., $3.50. The first half of the book is devoted to a really successful synthesis of anatomy and physiology, the second half to systematics and phylogeny. It is well illustrated and has a good glossary and index.

Science News Letter, July 9, 1932

Archaeology

A SURVEY OF PREHISTORIC SITES IN THE REGION OF FLAGSTAFF, ARIZONA—Harold S. Colton—*Govt. Printing Office,* 69 p., 30c. The region surveyed by Dr. Colton is recognized as having been the center of a large ancient population. The 649 recorded ruins have received very little study, he points out.

Science News Letter, July 9, 1932

Medicine

THE AETIOLOGY OF TUBERCULOSIS—Robert Koch—*National Tuberculosis Association,* 48 p., 50c. In connection with the celebration of the fiftieth anniversary of Koch's announcement of the discovery of the tubercle bacillus, the National Tuberculosis Association has published this translation, by Dr. and Mrs. Max Pinner, of Koch's original paper presented before the Physiological Society in Berlin. An introduction by Dr. Allen K. Krause gives the background for a proper understanding of this important piece of work.

Science News Letter, July 9, 1932

Ancient History—Archaeology

THE MYCENAEAN ORIGIN OF GREEK MYTHOLOGY—Martin P. Nilsson—*Univ. of Calif. Press,* 258 p., $3.50. In this collection of the Sather Classical Lectures, Prof. Nilsson sets forth his theory that the epics go back into an early period of the Mycenaean age, and that the background of the Homeric epics originated in the Mycenaean age. Prof. Nilsson draws evidence from a wide variety of sources, including Mycenaean remains, art, history, the technique of epic singer, and the names of mythical heroes.

Science News Letter, July 9, 1932

Botany

GENERAL BOTANY FOR COLLEGES—R. E. Torrey—*Century,* 449 p., $3.50. A third edition of a successful textbook in botany. The author's endeavor is not merely to give thorough instruction in one science, but to make the course in botany an introduction to and an exemplification of the entire scientific method.

Science News Letter, July 9, 1932

Ethnology

BLACK ON WHITE—M. Ilin—*Lippincott,* 135 p., $1.50. The art of writing simply is well understood by the young Russian engineer, M. Ilin. This history of writing and book-making is suitable for children, yet the grown-up reader finds himself turning pages and learning facts about knot writing, Babylonian tablets, the wanderings of the alphabet, medieval manuscripts, and, finally, paper "the conqueror." Mr. Ilin's books, originally in Russian, are designed for an audience of children, factory workers, and farmers. The translator is Beatrice R. Kincead; the illustrator, N. Lapshin.

Science News Letter, July 9, 1932

Entomology

THE LIFE OF THE BUTTERFLY—Friedrich Schnack, transl. by Winifred Katzin—*Houghton Mifflin,* 278 p., $2.50. A German here does for the butterfly what Maeterlink has done for the bee and the termite; and his translator catches the spirit as well as the letter of his words. Though many of his species will be strangers to those who know only American butterflies, the book is nevertheless as well worth having as is a translation of one of Fabre's.

Science News Letter, July 9, 1932

Ornithology

THE BIRDS OF THE AIR—A. W. Seaby—*A. and C. Black, London,* 179 p., $2.25. A British ornithologist writes of the birds of his native island with such enthusiasm that he carries with him even a reader in another land. It is interesting, too, to meet in another environment some birds known in America.

Science News Letter, July 9, 1932

Education

A SURVEY OF SIGHT-SAVING CLASSES IN THE PUBLIC SCHOOLS OF THE UNITED STATES—Edward T. Meyers—*National Society for the Prevention of Blindness,* 105 p., 50c. This pamphlet contains valuable facts, figures and suggestions for educators interested in the large group who attend or should attend special sight-saving classes.

Science News Letter, July 9, 1932

Metaphysics

THE OPEN WORLD—Herman Weyl—*Yale Univ. Press,* 84 p., $1.50. A mathematician in search of God travels the toilsome road of German metaphysics. He finds the clearest footprints of Divinity in the exact sciences: "In our knowledge of physical nature we have penetrated so far that we can obtain a vision of the flawless harmony which is in harmony with sublime reason. Here is neither suffering nor evil nor deficiency, but perfection only."

Science News Letter, July 9, 1932

Zoology

MEXICAN TAILLESS AMPHIBIANS IN THE UNITED STATES NATIONAL MUSEUM—Remington Kellogg—*Govt. Print. Off.,* 224 p., 30c. Of interest to systematic zoologists.

Science News Letter, July 9, 1932

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